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BIOGRAPHY

I am a Full Professor at the Department of Systems and Energy (DSE) at the School of Electrical and Computer Engineering (FEEC) at the University of Campinas (UNICAMP), Brazil, where I have been a faculty member since 2006. UNICAMP is one of the best universities in Latin America regularly classified as the top 3 in the main international academic rankings, such as QS Quacquarelli Symonds and Times Higher Education. I earned my B.Sc. and M.Sc. degrees in Electrical Engineering from Sao Paulo State University (UNESP), in 1994 and 1996, respectively, and my Ph.D. degree in Electrical Engineering from the University of Campinas (UNICAMP) in 2001.

My research interests include integration of distributed energy resources, analysis of power systems, application of data analytics to distribution systems, power system protection, control and automation, power quality, and sustainable energy systems. In collaboration with my team, I have co-authored more than 80 papers published in peer-reviewed top-class journals and more than 100 papers published in peer-reviewed top-class conferences, which have been highly cited. In 2022, I was listed in the *World's Top 2% Scientists by Stanford University*[1] and ranked as *Top 10 Electronics and Electrical Engineering Scientist in Brazil* in *Research.com – Top Scientists Ranking*. As of January 2024, these are the main citation metrics considering the most relevant scientific databases: Scopus: number of citations: 4,065, H-index: 33; Web of Science: number of citations: 2,851, H-index: 31; Google Scholar: number of citations 6,321, H-index: 39; IEEE Xplore: number of citations 2,795, number of downloads/views: 89,818.

I am also a co-inventor of 3 patents and 2 registered and licensed software. One of them, is commercialized by a major Brazilian IT company for distribution planning and decision-making processes considering the integration of distributed energy resources. The other one is used by a major Brazilian distribution utility (CPFL Energy with more than 10,000,000 customers) for energy loss management.

I am a co-author of a technical book on short-circuit analysis, written in Portuguese, which sold more than 3,000 copies, and it has been adopted by young engineers to fill the gap between theory and practice and by senior engineers to update their knowledge. The main contribution of this book is its technical-theoretical approach based on the experience of the authors.

I manage an active research program supported by industry and government agencies. As Principal Investigator (PI), I have participated in more than 50 R&D projects for Brazilian, Canadian, Indian and Costa Rican utilities and government agencies. These projects have attracted more than R$ 200,000,000 (~US$ 40,000,000) in investments. As one of the tangible results of these projects, I can mention the implementation of one of the largest, one-of-a-kind, living laboratories in Latin America for the integration of emerging technologies into electrical energy systems. In this concept, several technologies were installed in the field (at the utility feeders and final customers) to investigate the integration of photovoltaic generators, electric vehicles, smart meters, energy storage systems, custom power devices, among others. This living lab sends in real-time billions of measurement data per year to the computer servers installed at my UNICAMP laboratories, which are used to develop data analytics solutions. More information about this living laboratory can be found at: https://tinyurl.com/3fy76bst

I have served as editor, associate editor, guest associate editor, technical committee member, and reviewer for several international journals and conferences. I was an Associate Editor of the IEEE

[1] Ioannidis, John P.A. (2022), "September 2022 data-update for "Updated science-wide author databases of standardized citation indicators", Elsevier Data Repository, V4, doi: 10.17632/btchxktzyw.4

Transactions on Power Delivery and IEEE Power Engineering Letters for 7+ years, from 2014 to 2021, a Guest Editor for special issues of the IEEE Transactions on Energy Conversion, IEEE Transactions on Power Delivery, and IET Generation, Transmission and Distribution. Since 2021, I have been an Associate Editor of the IET Generation, Transmission and Distribution. In 2018, I received the Outstanding Reviewer Award from IEEE Transactions on Power Systems, and, in 2023, I received the Outstanding Reviewer Award from IEEE Transactions on Power Delivery.

I was Chair of the IEEE/PES Working Group on Power Quality Data Analytics from 2018 to 2020. As the chair of the working group, I received the IEEE/PES T&D Committee Award for Outstanding Technical Report in 2020. I have served as an invited panelist in more than 10 IEEE/PES Conferences and Meetings and organized several Panels and Special Sessions. From 2017 to 2021, I was a member of the Board of Directors of the NSERC Energy Storage Technology Network (NEST), one of the most relevant Canadian research projects on energy storage applications.

I supervised more than 50 Ph.D. students, M.Sc. students, and post-doctoral researchers. In 2013 and 2023, as a Ph.D. supervisor, I received the Ph.D. Dissertation CAPES National Award, the most prestigious Brazilian award recognizing the best Ph.D. dissertation finished per year. In addition, three Ph.D. dissertations completed under my supervision received the Best Ph.D. Dissertation Award from FEEC/UNICAMP, in 2013, 2018, and 2023. Most of my former students have established successful careers at top universities and research centers in Brazil and abroad. In addition, some of my former students, under my guidance and supervision, have founded a consulting and development company with revenues superior to US$ 1,000,000/year, which commercialize solutions based on my ideas.

At UNICAMP, I have taught several undergraduate and graduate courses related to the energy system area. I have always earned good student evaluation scores and have consistently been ranked as the top 10% of instructors over the past 15 years. I have been nominated several times for the Excellence Academic Award and have been invited multiple times to be the class patron of the undergraduate students.

Based on the previous information, one can see that I have tried to balance my contributions among research, teaching, and technological transfer to the industry. As recognition, I have received the three main awards granted by UNICAMP. In 2015, I received the Zeferino Vaz Award, the most prestigious award granted to recognize the quality of researchers. In 2020, I received the Educator Excellence Award, the most prestigious award granted to recognize the quality of educators. In 2022, I received the Outreach (Community Service) Award, the most prestigious award granted to recognize the contribution for society by transferring knowledge and technology to the industry and other sectors. From a national perspective, since 2006, I have been awarded the Research Productivity Grant (Tier 1) by CNPq (the main Brazilian federal research agency) given to the top Brazilian researchers based strictly on scientific productivity metrics.

In the past, I collaborated intensively with the University of Alberta, Canada, where I worked as a Post-doctoral Fellow and Visiting Professor in several opportunities between 2002 and 2015, collaborating with Prof. Wilsun Xu. More recently, I have started a collaboration with the Centre for Urban Energy at Toronto Metropolitan University, Canada, where I worked as a Visiting Professor from 2016 to 2017 and from 2022 to 2023, collaborating with Prof. Bala Venkatesh. Other relevant international collaborations established mainly through student exchanges are with the University of Texas at Austin, USA, collaborating with Prof. Surya Santoso, and the University of Melbourne, Australia, collaborating with Prof. Luis (Nando) Ochoa.

THE MOST DISTINCTIVE CONTRIBUTIONS (RESEARCH ACHIEVEMENTS)

In 2001, after finishing my Ph.D. studies on power system stability of large, interconnected, generation-transmission networks (bulk power systems), I decided to redirect my research efforts to investigate the integration of Distributed Energy Resources (DERs) into distribution systems, anticipating a tendency confirmed only ten years later. Therefore, over the past twenty years, my main contributions have been primarily related to this topic, *i.e.*, **integration of Distributed Energy Resources (DERs) into electrical energy systems**. The quality of these contributions can be evaluated based on (a) highly cited papers, (b) applications of my ideas to solve industry problems, for example, CPFL Energy (one of the largest Brazilian utilities with more than 10,000,000 customers) was able to save millions of dollars by using these methods, (c) the adoption of the results of these methods by the Brazilian National Electricity Regulatory Agency (in Portuguese: ANEEL – *Agência Nacional de Energia Elétrica*) to improve the DER regulations, and (d) the founding by my former students of an innovation company to commercialize these solutions with a current revenue exceeding US$ 1,000,000/year. These contributions are discussed as follows.

Anti-Islanding Protection of Distributed Energy Resources

Anti-islanding protection of distributed synchronous generators: In 2002, when the number of synchronous generators connected to medium voltage distribution systems started to increase, one issue faced by the industry was how to set and understand passive methods used for anti-islanding protection comprising frequency and voltage-based relays. I then pioneeringly proposed a series of graphical methods, curves, and charts, which can be used to clearly understand the performance of different protection functions and settings, revealing the positive and negative aspects of different solutions. Based on these curves, which I named performance curves, the concept of critical power imbalance was introduced for the first time. This can be used as a threshold to separate the safe region from the unsafe region from a protection perspective. These curves were initially developed by using numerous electromagnetic transient (EMT) simulations, which is a complex, time-consuming process to be applied by practical engineers. Therefore, next step was to develop a series of analytical formulas to estimate these curves without needing any simulations. These formulas and methods have been used by engineers all over the world to set these relays and coordinate graphically different functions to improve the quality of anti-islanding protection. These proposed curves enable a straightforward understanding of any frequency or voltage-based protection by using two different charts. Nevertheless, as these protection functions are simultaneously applied to distributed synchronous generators, I also originally developed the non-detection zone method for synchronous generators, integrating the analysis into one simple chart for the first time for this type of generator. To make the application of these non-detection zones feasible for practical engineers, I again developed a series of analytical formulas to estimate these zones by using simple spreadsheets, without running any EMT simulation. Finally, in this topic, I also developed a risk-based method for fast assessment of the effectiveness of passive protection, which has been widely used by protection engineers all over the world. Indeed, this solution has been applied by the Brazilian National Electricity Regulatory Agency (ANEEL) to approve non-standard protection solutions for critical cases identified by the method. These

contributions were mainly documented in a series of papers as follows: [J79], [J77], [J75], [J72], [J71], [J69], [J68], [J67], [J61], [J59], [J56], [J48], [J45].

Anti-islanding protection of distributed inverter-based generators: In 2005, as the number of inverter-based generators connected to medium and low voltage distribution systems started to increase, I decided to expand my research on islanding detection to cover this emerging technology. By then, researchers from General Electric (GE) had just published a technical report on the positive feedback scheme for active protection. In this report[2], I found the following statements:

> *"Although the concept has been proposed for more than a decade, most studies are focused on numerical simulation and lab testing. The design of the schemes is mostly on a heuristic basis." – page 13.*
>
> *"Although Sabe provides the small-signal-analysis function based on average model, its validity is in question for a higher-order system. After validation by time-domain simulation, it is concluded that the Saber built-in small-signal function does not provide satisfactory results for the system being studied." – page 21.*

I envisioned then an opportunity to contribute to this topic by analytically developing the small-signal models for the first time by using state-space representation not only for the GE schemes, but also for the Sandia active schemes. Firstly, these models were intensively and extensively validated by using time-domain analysis (EMT simulations). Thenceforth, after having validated the state-space representation, several analyses were conducted to fully reveal the mechanism of these active methods and understand the impact on the generator stability. Pioneering graphical methods to be used to design the protection solution using the developed small-signal models were also proposed. Finally, the impact of these solutions to the system stability was also clarified by developing a series of curves representing the relationship between the maximum power transfer limits and the positive feedback gains. These contributions were documented in the following papers: [J60], [J57], [J53], [J52], [J47].

Hosting Capacity of Distributed Energy Resources

In 2005, even before the term *hosting capacity* had become well-known, I started to develop useful methods to be applied by utilities to determine the maximum permissible penetration of distributed energy resources as a tool for planning. In this context, initially, I conducted the research by using intensive simulations taking into consideration synchronous and induction generators connected to medium voltage systems. Although these initial results were important to understand how different control and protection decisions affect the maximum capacity, *i.e.*, the hosting capacity, intensive simulation-based methods are challenging to be widely adopted by practical engineers as these are complex, time-consuming approaches. Therefore, in 2010, with my students, we developed several analytical methods to estimate the maximum hosting capacity for medium voltage systems without needing intensive simulations. These analytical methods can be used not only for traditional planning analysis, but also to speed up optimization-based methods, as it is not necessary to run repeated power flow, short-circuit or dynamic simulations. These methods can be used to estimate the impacts of DER integration on voltage profile, current ampacity, technical losses, short-circuit currents, and stability margins. More recently, in 2018, with the proliferation of rooftop PV generators connected to low voltage systems, with my students, we developed simplified stochastic-based approaches for

[2] Z. Ye, R. Walling, L. Garces, R. Zhou, L. Li, and T. Wang, "Study and development of anti-islanding control for grid-connected inverters," National Renewable Energy Laboratory, Tech. Rep. NREL/SR-560-36243, May 2004.

comprehensive assessment of hosting capacity simultaneously considering thousands of systems by using efficient models requiring only information readily available to the engineering department responsible for studies on system updates and expansions. This approach was important to reveal the main parameters, impacts and conditions affecting the hosting capacity, so that utility engineers can take actions for improved planning and operation, and regulatory agencies can have more information for policy-decisions. Similar ideas were also expanded to be applied to the analysis of electric vehicle charging stations. More recently, we developed a direct analytical method to estimate the hosting capacity of low voltage systems without needing time-consuming simulations taking into consideration voltage and current limits. These stochastic and analytical methods have been used by a major utility in Brazil with more than 10,000,000 customers (CPFL Energy, a State Grid owned company) for the decision-making process and hosting capacity management, saving millions of dollars by reducing the required number of man-hours of specialized engineers. The results of these analyses have also been used by the Brazilian National Electricity Regulatory Agency (ANEEL) to improve the regulatory model for DER integration. These contributions were documented in a series of papers as follows: [J80], [J74], [J70], [J66], [J58], [J55], [J50], [J35], [J31], [J26], [J21], [J18], [J5].

Development of a Living Laboratory for DER Integration

In order to conduct my research on the integration of DER, producing scientifical and technological advances simultaneously, I envisioned the deployment of a one-of-a-kind living laboratory, where all the ideas and concepts can be developed and tested in a real-world environment in which the final users participated, so that economic, social, regulatory, and market aspects can also be taken into consideration when proposing innovative technological solutions. Then, back in 2013, I partnered with a major Brazilian utility, CPFL Energy, a company owned by State Grid, to implement this laboratory, which is the largest one in Latin America. A substation, called Barao Geraldo, serving more than 10,000 customers and the University of Campinas through 2 x 138/11.9 kV-25 MVA power transformers and 10 x 11.9 kV feeders, was selected for implementation. In this system, several PV generators, battery storage energy systems, EV chargers, and power electronic-based regulators and compensators were installed, ranging from small capacities (few kVAs) to large capacities (few MVAs) connected to the MV and LV systems. A sophisticated monitoring infrastructure was also deployed consisting of smart meters, power quality meters, waveform measurement units and weather stations. This living lab generates billions of measurements per year, so that several data analytics and big data methods can be developed and tested. As these technologies are installed in the real world and at the utility systems and final customers, a sustainable R&D program could be developed comprising the complete innovation chain, from basic research to final products and commercialization, generating new solutions, business models, regulatory models, and start-up companies. More information about this living lab can be found at: https://tinyurl.com/3fy76bst

Data Analytics for DER Integration

The increasing installation of DERs and technological advances have also motivated the deployment of modern monitoring systems, which can be composed, for example, by customer smart meters, collecting low resolution rms data, power quality meters, collecting rms and event-triggered waveform data, and/or sophisticated waveform measurement units, collecting synchronized or unsynchronized

gapless voltage and current waveforms. These systems make possible the development of a new world of applications to facilitate the integration of DERs, for example. Recognizing this potential, in 2013, Prof. Wilsun Xu, from the University of Alberta, Canada, Prof. Surya Santoso, from the University of Texas, USA, and myself proposed the establishment of a Working Group (WG) called Power Quality Data Analytics, which was approved by the IEEE/PES Power Quality Subcommittee and has been active since 2014. In this context, I was the WG Secretary from 2014 to 2016, the WG Vice Chair from 2016 to 2018, and the WG Chair from 2018 to 2020. During my period as chair, the technical report called Electric Signatures of Power Equipment Failures (PES-TR73) was developed, approved, and published. The relevance and quality of this technical report was recognized by the community with the IEEE PES T&D Committee Award for Outstanding Technical Report in 2020. Another relevant contribution in this topic was the development of methods for detection, analysis, and mitigation of sub-synchronous and harmonic resonances due to the interaction among power electronic-based wind generators and transmission systems with series and shunt compensation. Firstly, a series of new charts was developed for fast risk assessment of resonances, which can also be used to determine the main components affected by weakly damped resonances. In the case of sub-synchronous resonances, a fast, pioneering method was developed to protect the generators by using synchronized voltage waveforms collected at the terminals of the connection line. The method can detect these resonances with high speed, typically 1/4 of sub-synchronous cycle, and accuracy. Most of these methods are based on high resolution measurements (waveforms). In the context of data analytics, with the collaboration of my students, we also developed several methods based on rms data from customer smart meters for fault location, non-technical loss detection and location, and automated correction of utilities GIS database in the presence of DERs. These contributions were documented in the following papers: [J44], [J36], [J34], [J28], [J30], [J24], [J23], [J22], [J20], [J12], [J7], [J4], [J3], [J2].

Therefore, based on my previous comments, I believe that my contributions have undoubtedly supported the development of innovative ideas, methods, and concepts to facilitate the **integration of Distributed Energy Resources (DERs) into electrical energy systems**. Indeed, these methods have been used all over the world by researchers and engineers. From a tangible perspective, unquestionably, one can see that they have been used by the Brazilian National Electricity Regulatory Agency (ANEEL), improving the DER regulations, and by CPFL Energy, saving millions of dollars per year.

IEEE MEMBERSHIP, SERVICES AND AWARDS

Recognizing the value of the IEEE/PES for the electrical sector and society, I have collaborated with and supported several of the activities organized by this relevant society. The list of my main contributions is as follows:

- IEEE Member for 26 years (status: Senior Member) – Region 9.
- Associate Editor of the IEEE Transactions on Power Delivery for 7+ years (03/2014–07/2021) – number of manuscripts decided: 463.
- Associate Editor of the IEEE Power Engineering Letters for 7+ years (03/2014–07/2021) – number of manuscripts decided: 17.
- Guest Associate Editor for 2 Special Issues of IEEE/PES journals: 1 published by IEEE Transactions on Power Delivery and 1 published by IEEE Transactions on Energy Conversion.
- Chair of the IEEE Working Group on Power Quality Data Analytics – period: 2018-2020.
- Vice-chair of the IEEE Working Group on Power Quality Data Analytics – period: 2016-2018.
- Secretary of the IEEE Working Group on Power Quality Data Analytics – period: 2014-2016.
- Invited speaker at IEEE/PES conferences – number of presentations: 14 – General Meeting (8), ICHQP (2); ISGT-LA (2), PVSC (1), PowerAfrica (1).
- Presentation on Webinar promoted by IEEE/PES: 1.
- Chair of Panel Sessions or Special Sessions in IEEE/PES conferences: 3 – General Meeting (2), ICHQP (1).
- Member of technical committees of IEEE/PES conferences: 8 – ICHQP (4), PowerTech (1), ISGT (3).
- Review activities for IEEE/PES journals – 371 reviews completed: IEEE Transactions on Power Delivery (170); IEEE Transactions on Power Systems (109); IEEE Transactions on Smart Grid (50); IEEE Transactions on Energy Conversion (13); IEEE Transactions on Sustainable Energy (8); IEEE Power Engineering Letters (17); IEEE Open Access Journal of Power and Energy (4).
- Papers published in IEEE/PES journals – 53 papers: IEEE Transactions on Power Delivery (29); IEEE Transactions on Power Systems (11); IEEE Transactions on Smart Grids (5); IEEE Transactions on Energy Conversion (5); IEEE Transactions on Sustainable Energy (1), IEEE Open Access Journal of Power and Energy (2).
- IEEE/PES Awards:
    - Outstanding Reviewer Award 2022 – IEEE Transactions on Power Delivery.
    - IEEE PES T&D Committee Award for Outstanding Technical Report 2020 – as the Chair of the Working Group on Power Quality Data Analytics.
    - Outstanding Reviewer Award 2018 – IEEE Transactions on Power Systems.
    - Best Conference Papers on Power System Modeling and Analysis – IEEE/PES General Meeting 2016.

PROFESSIONAL EXPERIENCE

- **University of Campinas (UNICAMP) – Brazil**
  Department of Systems and Energy System
  Full Professor: April 2017 – present
  Associate Professor: October 2008 – March 2017
  Assistant Professor: March 2006 – September 2008
  Post-doctoral Fellow: October 2003 – February 2006
  Post-doctoral Fellow: July 2001 – September 2002

- **Toronto Metropolitan University (TMU) – former Ryerson University (RU) – Canada**
  Centre for Urban Energy
  Visiting Professor: December 2016 – December 2017
  Visiting Professor: March 2023 – February 2025

- **University of Alberta (UofA) – Canada**
  Department of Electrical and Computer Engineering
  Visiting Professor: December 2013 – July 2014
  Visiting Professor: July 2011 – January 2012
  Post-doctoral Fellow: September 2005 – February 2006
  Post-doctoral Fellow: October 2002 – September 2003

EDUCATIONAL RECORDS

- **Ph.D. in Electrical Engineering (June 2001)**
  Department of Electrical Energy Systems, University of Campinas – Brazil
  Thesis: Vector Control of Synchronous Generators by Using FACTS Devices to Improve Transient Stability of Power Systems.
  GPA: 4 out of 4.
  Supervisor: Professor Andre Morelato.

- **M.Sc. in Electrical Engineering (December 1996)**
  Department of Electrical Engineering, Sao Paulo State University – Brazil
  Thesis: Dynamic Security Control of Power Systems through Sensitivity Analysis and Artificial Neural Network.
  GPA: 4 out of 4.
  Supervisor: Professor Carlos Roberto Minussi

- **B.Sc. in Electrical Engineering (February 1994)**
  Faculty of Engineering of Ilha Solteira – Sao Paulo State University – Brazil

PUBLICATIONS

Papers in Refereed International Journals

During my career, I have focused on quality over quantity, therefore most of my papers have been published in the Transactions journals of IEEE/PES. As mentioned previously, these papers have been highly cited and read, as one can see based on the following metrics:

Scopus		**Web of Science**	
Number of citations	4,065	Number of citations	2,851
H-index	33	H-index	31
Number of documents	147	Number of documents	120
Google Scholar		**IEEE Xplore (Cross Ref)**	
Number of citations	6,321	Number of citations	2,795
H-index	38	Number of downloads/views	89,918

[J1] R. S. Bonadia, F. C. L. Trindade, W. Freitas, B. Venkatesh, “On the potential of ChatGPT to generate distribution systems for load flow studies using OpenDSS,” **IEEE Transactions on Power Systems**, vol. 38, pp. 5965-5968, 2023.

[J2] A. Arguello, R. Torquato, W. Freitas, "Passive Filter Tuning for Harmonic Resonance Mitigation in Wind Parks,” **IEEE Transactions on Power Delivery**, vol. 38, pp. 3834-3846, 2023.

[J3] R. Torquato, A. Arguello, W. Freitas, "Comparative analysis between the effect of type III and type IV generators on risk of harmonic resonances in wind parks,” **IEEE Transactions on Power Delivery**, vol. 38, pp. 1169-1181, 2023.

[J4] A. Arguello, R. Torquato, B. Rosado, W. Freitas, "Modeling of single-phase photovoltaic generators for system-wide harmonic power flow studies," **IEEE Transactions on Power Delivery**, vol. 38, pp. 914-926, 2023.

[J5] R. Torquato, W. Freitas, F. Trindade, "Practical method for first-screening assessment of new PV connection requests on unbalanced low voltage distribution systems," **IEEE Transactions on Power Delivery**, vol. 38, pp. 363-375, 2023.

[J6] C. O. Pereira, R. Torquato, W. Freitas, H. Ding, "Wide-scale assessment of the payback of a battery energy storage system connected to MV customers," **IEEE Transactions on Sustainable Energy**, vol. 14, pp. 1909-1912, 2023.

[J7] A. Arguello, R. Torquato, W. Freitas, "Method for assessing the risk of subsynchronous oscillations in DFIG-based wind parks," **IEEE Transactions on Power Delivery**, vol. 37, pp. 5071-5080, 2022.

[J8] B. P. Cancian, J. C. G. Andrade, W. Freitas, “Technical-economic evaluation of EV fast charging station with distributed energy resources,” Journal of Control Automation and Electrical Systems, v. 33, p. 1724-1738, 2022.

[J9] V. B. F. Costa, G. N. D. Doile, G. Troiano, B. H. Dias, B. D. Bonatto, T. Soares, W. Freitas, “Electricity markets in the context of distributed energy resources and demand response programs: main developments and challenges based on a systematic literature review,” Energies, v. 15, p. 7784, 2022.

[J10] G. Alonso, R. Alonso, A. C. Z. Souza, W. Freitas, "Enhanced artificial immune systems and fuzzy logic for active distribution systems reconfiguration," Energies, v. 15, p. 9419, 2022.

[J11] R. Torquato, G. Tessmer Hax, W. Freitas, A. B. Nassif, "Impact assessment of high-frequency distortions produced by PV inverters," **IEEE Transactions on Power Delivery**, vol. 36, pp. 2978-2987, 2021.

[J12] A. Arguello, R. Torquato, W. Freitas, A. Padilha-Feltrin, "A graphical method to assess component overload due to harmonic resonances in wind parks," **IEEE Transactions on Power Delivery**, vol. 36, pp. 1819-1828, 2021.

[J13] V. Cunha, T. Kim, N. Barry, P. Siratarnsophon, S. Santoso, W. Freitas, D. Ramasubramanian, R. Dugan, "Generalized formulation of steady-state equivalent circuit models of grid-forming inverters," **IEEE Open Access Journal of Power and Energy**, vol. 8, pp. 352-364, 2021.

[J14] V. Cunha, T. Kim, P. Siratarnsophon, N. Barry, S. Santoso, W. Freitas, "Quasi-static time-series power flow solution for islanded and unbalanced three-phase microgrids," **IEEE Open Access Journal of Power and Energy**, vol. 8, pp. 97-106, 2021.

[J15] F. Trindade, R. Torquato, W. Freitas, "Impact assessment of wide-scale rooftop PV penetration on overcurrent protection of distribution networks," **Journal of Control Automation and Electrical Systems**, v. 32, p. 682-692, 2021.

[J16] R. Torquato, A. Arguello, W. Freitas, "Practical chart for harmonic resonance assessment of DFIG-based wind parks," **IEEE Transactions on Power Delivery**, vol. 35, pp. 2233-2242, 2020.

[J17] B. Rosado, R. Torquato, B. Venkatesh, H. B. Gooi, W. Freitas, M. J. Rider, "Framework for optimizing the demand contracted by large customers," **IET Generation Transmission & Distribution**, vol. 14, pp. 635-644, 2020.

[J18] T. Barbosa, J. C. Garcia Andrade, R. Torquato, W. Freitas, F. Trindade, "On the use of EV hosting capacity for management of low-voltage distribution systems," **IET Generation Transmission & Distribution**, vol. 14, pp. 2620-2629, 2020.

[J19] T. S. D. Ferreira, F. Trindade, Y. G. Pinto, W. Freitas, "New analytical method for analysing the effectiveness of infrastructure reinforcement in electric power distribution systems," **Electric Power Systems Research**, vol. 182, pp. 106250, 2020.

[J20] V. Cunha, W. Freitas, F. Trindade, S. Santoso, "Automated determination of topology and line parameters in low voltage systems using smart meters measurements," **IEEE Transactions on Smart Grid**, vol. 11, pp. 5028-5038, 2020.

[J21] J. Andrade, L. Ochoa, W. Freitas, "Regional-scale allocation of fast charging stations: travel times and distribution system reinforcements," **IET Generation Transmission & Distribution**, vol. 14, pp. 4225-4233, 2020.

[J22] L Raggi, F. Trindade, V. Carnelossi da Cunha, W. Freitas, "Non-technical loss identification by using data analytics and customer smart meters," **IEEE Transactions on Power Delivery**, vol. 35, pp. 1-1, 2020.

[J23] A. Furlani Bastos, W. Freitas, G. Todeschini, S. Santoso, "Detection of inconspicuous power quality disturbances through step changes in rms voltage profile," **IET Generation Transmission & Distribution**, vol. 13, pp. 2226-2235, 2019.

[J24] B. Gao, R. Torquato, W. Xu, W. Freitas, "Waveform-based method for fast and accurate identification of subsynchronous resonance events," **IEEE Transactions on Power Systems**, vol. 34, pp. 3626-3636, 2019.

[J25] K. Masteri, B. Venkatesh, W. Freitas, "A fuzzy optimization model for distribution system asset planning with energy storage", **IEEE Transactions on Power Systems**, vol. 33, pp. 5114-5123, 2018.

[J26] R. Torquato, D. Salles, C. P. Oriente, P. C. M. Meira, W. Freitas, "A comprehensive assessment of PV hosting capacity on low voltage distribution systems," **IEEE Transactions on Power Delivery**, vol. 32, pp. 1002-1012, 2018.

[J27] K. Masteri, B. Venkatesh, W. Freitas, W. "A feeder investment model for distribution system planning including battery energy storage," Canadian Journal of Electrical and Computer Engineering, vol. 41, pp. 162-171, 2018.

[J28] F. Trindade, W. Freitas, "Low voltage zones to support fault location in distribution systems with smart meters," **IEEE Transactions on Smart Grid**, vol. 8, pp. 2765-2774, 2017.

[J29] F. Trindade, T. S. D. Ferreira, M. G. Lopes, W. Freitas, "Mitigation of fast voltage variations during cloud transients in distribution systems with PV solar farms," **IEEE Transactions on Power Delivery**, vol. 32, pp. 921-932, 2017.

[J30] D. Salles, A. Pinto, W. Freitas, "Integrated Volt/var control in modern distribution power systems based on support vector machines," **International Transactions on Electrical Energy Systems**, vol. 26, pp. 2216-2229, 2016.

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Book

I am the co-author of a technical book, published in Portuguese, that has been used by young engineers to fill the gap between theory and practice and by senior engineers to update their knowledge. The main contribution of this book is its technical-theoretical approach based on the experiences of the authors.

[B1] F. Sato, W. Freitas, **Análise de Curto-circuito e Princípios de Proteção em Sistemas de Energia Elétrica – Fundamentos e Prática** (in Portuguese), Elsevier/Campus, 2015 (over 3,000 copies sold).

Book Chapters

[BC1] V. C. Cunha, R. Torquato, T. R. Ricciardi, F. C. Trindade, W. Freitas, V. B. Riboldi, T. Ji, “Applications of battery energy storage systems for distribution systems,” In: **Applications of battery energy storage systems for distribution systems**. 1ed.: **IET Digital Library**, 2023,

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Papers in Refereed Conferences

Although my main focus is to publish papers in journals, I have also published several papers in conferences to take the opportunity to exchange experiences with other professionals. As such, I have published more than 100 conference papers[3].

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LICENSED SOFTWARE AND PATENTS

Registered, Licensed Software

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RESEARCH FUNDING

I operate an active research program supported by industry and government agencies. As Principal Investigator (PI), I have participated in more than 50 R&D projects for utilities and government agencies.

These projects have attracted more than R$ 200,000,000 (~US$ 40,000,000) in investments. As one of the tangible results from these projects, I can mention the implementation of one of the largest, one-of-a-kind, living laboratories in Latin America for the integration of emerging technologies into electrical energy systems. More information about this living lab. can be found at: https://tinyurl.com/3fy76bst.

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[36] Optimization model of national interconnected dispatch (2010 - 2011). Support: Bandeirantes Energia S/A (a Brazilian power distribution utility). Period: 2010-2011.

[37] Generalized modeling of industrial facilities by using templates. Principal Investigator: Wilsun Xu. Support: Alberta Power Industry Consortium (Canada). Period: 2009-2013.

[38] Analysis, control and protection of electrical energy systems of the future. Support: CNPq (a Brazilian Government Fund Agency). Period: 2009-2012.

[39] Development of graphical and analytical methods for motor starting design. Support: CNPq (a Brazilian government fund agency). Period: 2009-2011.

[40] Impact of utility fault-clearing practice on power quality and reliability. Principal Investigator: Wilsun Xu. Support: Nova Scotia Power (Canada). Period: 2009-2011.

[41] Development of computational tools for power systems planning and operation. Support: FAPESP (a Sao Paulo State fund agency). Period: 2008-2012.

[42] Protection, control and operation of modern distribution systems with distributed generation. Support: CNPq (a Brazilian Government Fund Agency). Period: 2007-2009.

[43] Utility Guide for Motor Starting Planning. Principal Investigator: Wilsun Xu. Support: Alberta Power Industry Consortium (Canada). Period: 2007-2008.

[44] Protection, control and supervision of modern distribution systems with distributed generators. Support: CNPq (a Brazilian Government Fund Agency). Period: 2006-2008.

[45] Implementation of a digital protection laboratory. Support: Schweitzer Engineering Laboratories, Brazil. Period: 2006-2008.

[46] Development of computational tools to determine and analyze the technical impact of distributed generators. Support: Eletropaulo AES (a Brazilian distribution utility). Period: 2006-2008.

[47] Islanding risk of synchronous generator-based distributed generation systems. Principal investigator: Wilsun Xu. Support: The CANMET Energy Technology Centre (Canada). Period: 2006-2007.

[48] Optimal short-time planning of interconnected power system. Support: FAPESP (a Sao Paulo State Fund Agency). Period: 2005-2009.

[49] Analysis and control of power system voltage instabilities. Support: FAPESP (a Sao Paulo State Fund Agency). Period: 2005-2008.

[50] Anti-islanding protection of synchronous generators connected to distribution networks. Support: CNPq (a Brazilian government fund agency). Period: 2005-2006.

[51] Development of system for prognostication and maintenance of distribution system circuit breakers by using a probabilistic support. Support: ELEKTRO (a Brazilian distribution utility). Period: 2004-2005.

[52] Impacts caused by parallelism of power transformer and feeders due to ring closing in distribution networks. Support: ELEKTRO (a Brazilian distribution utility). Period: 2004-2005.

Funds from Project-Based Grants for Visitors, Researchers, Undergrad and Grad Students

These are specific funds to cover the costs with students and visitors, including living stipends, trips to conferences and equipment related to individual research.

Visiting Professor

[53] Benedito Donizeti Bonatto. Smart grids and smart markets frameworks in the context of grid edge technologies. Period: 2022-2023. Support: FAPESP.

[54] Antonio Padilha Feltrin. Investigations of sustainable solutions for the integration of emerging technologies into the energy distribution systems of the future. Period: 2019-2020. Support: FAPESP.

Post-doctoral Fellowship (PDF)

[55] Ricardo Torquato Borges. Methodologies for the Integration of High-Resolution Measurements on Management of Modern Power Distribution Systems. Period: 2019-2022. Support: FAPESP.

[56] Tiago Rodarte Ricciardi. Technological and scientific developments for the next generation of electrical energy distribution systems. Period: 2015-2016. Support: CNPq.

[57] Fernanda Caseno Trindade Arioli. Development of Methodologies for the Integration of Smart Meters in Distribution Management Systems. Period: 2013-2015. Support: FAPESP.

[58] Diogo Salles Correa. Power Quality Data Analytics: Information Extraction from Power Quality Disturbances. Period: 2012-2016. Support: FAPESP.

[59] Ahda Pionkoski Grilo Pavani. Development of analytical methods for analysis of doubly-fed induction generators connected to electrical networks. Period: 2008-2009. Support: FAPESP.

Post-doctoral Fellowship (PDF) – Research Internship Abroad

[60] Diogo Salles Correa. Intelligent analytics techniques for improving power quality of modern distribution systems. Period: 2013-2014. Support: FAPESP. Ryerson University, Canada.

Ph.D. Students

[61] Bárbara Resende Rosado. Data Analytics for Condition Monitoring in Modern Electric Power Distribution Systems. Period: 2020-2023. Support: FAPESP.

[62] Vinicius Carnelossi da Cunha. Integration of new methods into distribution management systems in the presence of distributed energy resources and smart meters. Period: 2017-2022. Support: FAPESP.

[63] Caio Oriente Pereira. Development of Applications for Electrical Energy Storage Systems in Modern Distribution Systems. Period: 2017-2021. Support: FAPESP.

[64] José Carlos Garcia Andrade. Holistic Optimal Allocation of Fast Charging Electric Vehicles Stations. Period: 2016-2020. Support: FAPESP.

[65] Ricardo Torquato Borges. Methodologies for assessment of emerging power quality impacts on modern power distribution systems. Period: 2014-2017. Support: FAPESP.

[66] Rafael Cuerda Monzani. Non-intrusive monitoring and identification of energy consumption of residential appliances. Period: 2013-2016. Support: FAPESP.

[67] Tiago Rodarte Ricciardi. Contributions to Load Modeling for Power Systems Static and Dynamic Analysis. Period: 2011-2014. Support: FAPESP.

[68] Paulo César Magalhães Meira. A Framework for Determination of the Fault-Clearing Practice in Power Distribution System from Power Quality and Reliability Perspectives. Period: 2010-2013. Support: FAPESP.

[69] Fernanda Caseño Trindade Arioli. Development of Intelligent Methods for Fault Location in Modern Power Distribution System. Period: 2009-2013. Support: FAPESP.

[70] Diogo Salles Correa. Methodologies for evaluating the collective impact of residential loads in modern power distribution systems. Period: 2008-2012. Support: FAPESP.

[71] Hugo Murici Ayres. Definitions of performance indexes for optimal allocation of distributed generation in electric power distribution systems. Period: 2006-2010. Support: FAPESP.

[72] Ahda Pionkoski Grilo Pavani. Analytical Methods for Analysis of Induction Generators Connected to Electric Power Distribution Systems. Period: 2005-2008. Support: FAPESP.

Ph.D. Students – Research Internship Abroad

[73] Vinicius Carnelossi da Cunha. Estimation of topology, line parameters and switches status in medium voltage distribution systems using smart meter measurements. Period: 2020-2020. Support: FAPESP. University of Texas at Austin, USA.

[74] José Carlos Garcia Andrade. Allocation of fast charging electric vehicle stations. Period: 2017-2018. Support: FAPESP. University of Melbourne, Australia.

[75] Ricardo Torquato Borges. Integration of low-carbon technologies for improving power quality indices of modern power distribution system. Period: 2016-2017. Support: FAPESP. Ryerson University, Canada.

M.Sc. Students

[76] Manuella Caetano Marçal. Management of public charge stations for electric vehicles by using index of individualized performance. Period: 2019-2021. Support: FAPESP.

[77] Caio Oriente Pereira. Voltage control of electric power distribution systems with a high penetration of micro and mini distributed generation. Period: 2015-2017. Support: FAPESP.

[78] José Carlos Garcia Andrade. Impact of photovoltaic generation on the long-term demand of distribution systems. Period: 2014-2016. Support: FAPESP.

[79] Thiago Sonnewend Diniz Ferreira. Development of methods for detection and location of non-technical losses exploring smart meters. Period: 2013-2015. Support: FAPESP.

[80] Ricardo Torquato Borges. Development of methods for systemic analysis of electric power distribution systems with ultra-dispersed generation. Period: 2012-2014. Support: FAPESP.

[81] Tiago Rodarte Ricciardi. Development of Methodologies for Analysis of Positive Feedback Anti-Islanding Protection of Inverter-Based Generators. Period: 2009-2010. Support: FAPESP.

[82] Fernanda Caseño Trindade Arioli. Development of automated methodologies for protection and control of industrial systems with synchronous generators during islanded operation. Period: 2007-2009. Support: FAPESP.

[83] Diogo Salles Correa. Methodology for evaluating the risk of occurrence of non-intentional islanding of distributed synchronous generators. Period: 2007-2008. Support: FAPESP.

M.Sc. Students – Research Internship Abroad

[84] Thiago Sonnewend Diniz Ferreira. Development of methods for detection and location of non-technical losses exploring smart meters. Period: 2013-2014. Support: FAPESP. University of Alberta, Canada.

[85] Ricardo Torquato Borges. Development of simulation platform of secondary distribution networks in modern electrical energy systems: photovoltaic generation module. Period: 2013-2013. Support: FAPESP. University of Alberta, Canada.

Scientific Initiation – undergraduate students

[86] Juliana Carvalho Silva de Sá. Impact assessment of PV systems on energy balance of power distribution system. Period: 2015-2016. Support: FAPESP.

[87] Thiago Sonnewend Diniz Ferreira. Technical impacts caused by the connection of generators to low voltage distribution networks. Period: 2012-2013. Support: FAPESP.

[88] Anderson Cleyton Bravalheri. Dynamic modeling of anti-islanding protection scheme of inverter-based generator for transient stability analysis. Period: 2009-2010. Support: FAPESP.

[89] Alexandre Ricardo Schwaida. Analytical stability analysis of doubly fed induction generators. Period: 2009-2010. Support: FAPESP.

[90] Mateus Gomes da Silva Tolentino Gonçalves. Dynamic analysis of industrial systems with synchronous generators during islanded operation. Period: 2007-2008. Support: FAPESP.

[91] David Rodrigues de Carvalho. Impacts of Distributed generators on voltage sag due to short-circuits. Period: 2006-2007. Support: FAPESP.

[92] Diogo Salles Correa. Analysis of voltage relays for islanding detection of synchronous distributed generators. Period: 2004-2005. Support: FAPESP.

[93] Jonathan da Cruz Leão. Impacts of dynamic VAR compensators in induction generators protection. Period: 2004-2005. Support: FAPESP.

SUPERVISION OF VISITING PROFESSORS, POST-DOCTORAL FELLOWS, GRADUATE AND UNDERGRADUATE STUDENTS

Visiting Professors and Associate Researchers (6)

[1] Ricardo Torquato Borges. Period: 2023 – current.

[2] Tiago de Moraes Barbosa. Period: 2023 – current.

[3] José Carlos Garcia Andrade. Period: 2020 – current.

[4] Tiago Rodarte Ricciardi. Period: 2020 – current.

[5] Benedito Donizeti Bonatto. Period: 2022 – 2023.

[6] Antônio Padilha Feltrin. Period: 2019 – 2020.

Post-doctoral Fellows (10)

[7] Tiago de Moraes Barbosa. Period: 2021 – 2022.

[8] Ricardo Torquato Borges. Period: 2020 – 2022.

[9] Tiago Rodarte Ricciardi. Period: 2015 – 2020.

[10] Paulo César Magalhães Meira. Period: 2014 – 2020.

[11] Diogo Salles Corrêa. Period: 2012-2017.

[12] Fernanda Caseño Lima Trindade. Period: 2013-2015.

[13] Ahda Pionkoski Grilo. Period: 2008-2009.

[14] José Carlos de Melo Vieira Júnior. Period: 2006-2007.

[15] Igor Kopcak. Period: 2007-2009.

[16] Madson Cortes Almeida. Period: 2008-2009.

Ph.D. Students (21)

[17] Efrem Ferreira. Application of clustering techniques for the analysis of power distribution systems. Defense: TBD.

[18] Barbara Resende Rosado. Data analytics for condition monitoring in modern electric power distribution systems. Defense: TBD.

[19] Gláucio Roberto Tessmer Hax. Impact of PV generators and electric vehicles on high frequency distortions. Defense: 2023.

[20] Vinicius Carnelossi da Cunha. Integration of methods into distribution management systems in the presence of distributed energy resources and smart meters. Defense: 2022.

[21] Caio Oriente Pereira. Development of applications for electrical energy storage systems in modern distribution systems. Defense: 2022.

[22] Andrés Argüello Guillén. Anticipation and mitigation of power quality issues using high resolution monitored data and network characteristics. Defense: 2022.

[23] Tiago de Moraes Barbosa. Stochastic analysis of low voltage power distribution systems. Defense: 2021.

[24] Thiago Correia Vieira. Decentralized control methodologies for the use of electric vehicles to improve the quality of electric energy and the reliability of power systems. Defense: 2021.

[25] José Carlos Garcia Andrade. Holistic optimal allocation of fast charging electric vehicle stations. Defense: 2020.

[26] Lívia Maria de Rezende Raggi. Application of estate estimation in distribution power systems with smart meters. Defense: 2018.

[27] Ricardo Torquato Borges. Methodologies for assessment of emerging power quality impacts on modern power distribution systems. Defense: 2017.

[28] Rafael Cuerda Monzani. Non-invasive monitoring and identification of individual energy consumption of residential loads. Defense: 2016.

[29] Tiago Rodarte Ricciardi. Contributions to load modeling for static and dynamic analysis of power systems. Defense: 2015.

[30] Paulo César Magalhães Meira. Analysis of fault-clearing policies in power distribution systems from power quality and reliability perspectives. Defense: 2014.

[31] Newton José do Salles. Multi-environment modeling of protection systems for intentional islanding operation with synchronous generators. Defense: 2013.

[32] Fernanda Caseño Lima Trindade. Development of fault location methods for distribution systems with smart meters. Defense: 2013.

[33] Diogo Salles Corrêa. Methodology for evaluating the collective harmonic impact of residential loads in modern power distribution systems. Defense: 2012. Awarded with The Best CAPES Dissertation Award (Engineering IV area)

[34] Hugo Murici Ayres. Development of methodologies to analyze distributed generators in electric distribution systems. Defense: 2010.

[35] Maurício Barbosa de Camargo Salles. Modeling and analysis of variable speed wind generators connected to the electrical power systems. Defense: 2009.

[36] Ahda Pionkoski Grilo. Analytical methods for analysis of induction generators connected to electric power distribution systems. Defense: 2008.

[37] José Carlos de Melo Vieira Júnior. Methods for setting and evaluating the performance of anti-islanding protection relays of distributed synchronous generators. 2006.

M.Sc. Students (29)

[38] Leonardo Hernandes, Data analytics techniques applied to modern distribution systems. Defence: TBD.

[39] Bruno Pissinatto Cancian. Methods for load-generation disaggregation by using smart meters. Defence: TBD.

[40] Júlia Beatriz Ramos da Conceição. Development of methodologies to analyze the impact of the high penetration of photovoltaic generation on transmission system usage contracts. Defense: 2023.

[41] Manuella Caetano Marçal. Management of public charge stations for electric vehicles by using index of individualized performance. Defense: 2022.

[42] Pedro Pereira de Almeida. Impact of harmonic distortions in the calculation of technical losses in electrical energy distribution systems. Defense: 2021.

[43] Tales Valias de Paiva. Study of the use of state estimation to determine steady-state voltage compliance in electric power distribution systems. Defense: 2021.

[44] Wagner Seizo Hokama. Synchronization analysis of open-loop islanded systems through the impedance insertion method. Defense: 2020.

[45] Andrés de Jesús Argüello Guillén. Resonance assessment in power systems with DFIG-based wind parks. Defense: 2019.

[46] Caio Oriente Pereira. Analysis of voltage control methods in electric power distribution systems with high penetration of micro- and mini generation. Defense: 2017.

[47] Vinicius Carnelossi da Cunha. Application of energy storage systems in distribution networks with high penetration of photovoltaic generation and electric vehicles. Defense: 2017.

[48] Fábio Alexandre Martins Monteiro. A behavioral and electrical simulator for residential low voltage networks. Defense: 2016.

[49] Vitor Torquato Arioli. Analysis of technical impacts caused by increased penetration of electric vehicles in electric power distribution systems. Defense: 2016.

[50] José Carlos Garcia Andrade. Impact of micro and mini photovoltaic generation on the long-term demand of distribution systems. Defense: 2016.

[51] Thiago Sonnewend Diniz Ferreira. Method for detection and location of non-technical losses in distribution systems exploring smart meters. Defense: 2015.

[52] Adriano Costa Pinto. Integrated voltage and reactive power control using machine learning. Defense: 2015.

[53] Tiago de Moraes Barbosa. Generalized methodology for steady state analysis of power distribution system. Defense: 2014.

[54] Ricardo Torquato Borges. Development of methods for systemic analysis of electric power distribution systems with ultra-dispersed generation. Defense: 2014.

[55] Rafael Schincariol da Silva. Distributed generators performance during short-circuits considering fault ride-through requirements. Defense: 2012.

[56] Esloany Daisy Carniatto Delvecchi. New signals for anti-islanding protection of synchronous distributed generators. Defense: 2011.

[57] Cecília de Freitas Morais. Development of graphical and analytical methods for analysis of direct starting of induction motors in industrial facilities. Defense: 2011.

[58] Paulo César Magalhães Meira. Analysis of the anti-islanding protection of induction generators connected to electric power distribution systems. Defense: 2010.

[59] Tiago Rodarte Ricciardi. Stability analysis of inverter-based distributed generators with antiislanding protection. Defense: 2010.

[60] Fernanda Caseño Lima Trindade. Analysis of protection and control systems in industrial plants with synchronous generators during islanded operation. Defense: 2009.

[61] Diogo Salles Correa. Methodologies for evaluating the risk of occurrence of non-intentional islanding of distributed synchronous generators. Defense: 2008.

[62] Alexandre Haruiti Anzai. A load flow model for distribution systems with different distributed generation technology. Defense: 2008.

[63] Newton José de Salles. Modeling and dynamic analysis of distribution network protection systems in the presence of synchronous generators. Defense: 2007.

[64] Lísias Vieira Lima de Abreu. Dynamic performance of synchronous generators connected to electric power distribution systems. Defense: 2005.

[65] Jesus Armando Moran Gallardo. Impact of synchronous generators on the steady state performance of electrical power distribution systems. Defense: 2005.

[66] Maurício Barbosa de Camargo Salles. Analysis of the dynamic performance of wind generators connected to electric power distribution systems. Defense: 2004.

Undergraduate Students (9)[4]

[67] Júlia Giatti Hidalgo. Investigation of the impact of photovoltaic generators on harmonic resonances in power distribution networks. 2022.

[68] Juliana Carvalho Silva de Sá. Impact assessment of PV systems on energy balance of power distribution system. 2016.

[69] Thiago Sonnewend Diniz Ferreira. Technical impacts caused by the connection of generators to low voltage distribution networks. 2013.

[70] Anderson Cleyton Bravalheri. Dynamic modeling of inverter-based distributed generators for transient stability analysis of electrical power systems. 2010.

[71] Alexandre Ricardo Schwaida. Analytical stability analysis of doubly fed induction generators. 2009.

[72] Mateus Gomes da Silva Tolentino Gonçalves. Dynamic analysis of industrial systems with synchronous generators during islanded operation. 2007.

[73] David Rodrigues de Carvalho. Impacts of distributed generators on voltage sag due to short-circuits. 2006.

[74] Diogo Salles Correa. Analysis of voltage relays for islanding detection of synchronous distributed generators. 2005.

[75] Jonathan da Cruz Leão. Impacts of dynamic VAR compensators in induction generators protection. 2005.

EDITORIAL BOARD, TECHNICAL COMMITTEE, REVIEW, WORKGROUP AND PANELIST ACTIVITIES

Editorial Board of International Journals

[1] Associate Editor of **IET Generation, Transmission and Distribution**, IET, since 2021, UK.

[2] Associate Editor of the **IEEE Transactions on Power Deliver**, *IEEE*, from 2014 to 2021, USA.

[3] Associate Editor of the **IEEE Power Engineering Letters**, *IEEE*, from 2014 to 2021, USA.

[4] Guest Editor of the **IET Generation, Transmission and Distribution** – Special Issue: Future Distribution Grids and Integrated Energy Systems, IET, 2021, UK.

[5] Guest Editor of the **IEEE Transactions on Energy Conversion** – Special Issue Modeling and Simulation Methods for Analysis and Design of Advanced Energy Conversion Systems, IEEE, 2020, USA.

[6] Guest Editor of the **IEEE Transactions on Power Deliver** - Special Issue Special Issue on Protection and Real-Time Monitoring of Transmission and Distribution Systems with High Penetration of Distributed Generation and Microgrids, IEEE, 2015, USA.

[4] 12-month research-based externally funded projects.

[7] Guest Associate Editor of the **International Journal of Global Energy Issues** - Special Issue on Global Applications of Renewable Energy for GHG Reduction, *Inderscience Publishers*, 2008, UK.

[8] Guest Associate Editor of the **International Journal of Energy Technology and Policy** - Special issue on Control and Protection of Distribution Systems with Distributed Generators, *Inderscience Publishers*, 2007, UK.

[9] Guest Associate Editor of the **International Journal of Global Energy Issues** - Special Issue on Policy and Economic Issues of Electrical Power and Energy Systems, *Inderscience Publishers*, 2007, UK.

[10] Guest Associate Editor of the **International Journal of Energy Technology and Policy** - Special Issue on Different Issues Related to the Operation of Wind Energy Conversion Systems, *Inderscience Publishers*, 2005, UK.

Technical Committee of International Conferences[5]

[1] IEEE/PES 20th International Conference on Harmonics and Quality of Power, 2022, Naples, Italy.

[2] IEEE/PES 19th International Conference on Harmonics and Quality of Power, 2020, Dubai, United Arab Emirates.

[3] IEEE/PES 18th International Conference on Harmonics and Quality of Power, 2018, Ljubljana, Slovenia.

[4] IEEE/PES 17th International Conference on Harmonics and Quality of Power, 2016, Belo Horizonte, Brazil.

[5] IEEE/PES Powertech 2017, UK, 2017.

[6] IEEE Canada Electrical Power and Energy Conference, Canada, 2017.

[7] IEEE/PES Innovative Smart Grid Technologies – ISGT-Europe, Slovenia, 2016.

[8] IEEE/PES Innovative Smart Grid Technologies – ISGT-LA, Uruguay, 2015.

[9] IEEE/PES Innovative Smart Grid Technologies – ISGT-LA, Brazil, 2013.

IEEE/PES Working Groups/Task Forces

[1] Member of the IEEE/PES Task Force on Distributed Energy Resource Islanding Detection, since 2020.

[2] Member of the IEEE/PES Working Group on Power Quality Data Analytics, since 2014.

[3] Chair of the IEEE/PES Working Group on Power Quality Data Analytics, 2018-2020.

[4] Vice-chair of the IEEE/PES Working Group on Power Quality Data Analytics, 2016-2018.

[5] Secretary of the IEEE/PES Working Group on Power Quality Data Analytics, 2014-2016.

[6] Member of the IEEE/PES Working Group on Modern & Future Distribution System Planning, 2014-2016.

[7] Member of the IEEE/PES Task Force on Modeling and Analysis of Rotating Machine-Based Distributed Resources, 2013-2015.

[8] Member of the IEEE/PELS Harmonic Filters & Power Quality Problems Working Group, 2007-2011.

[5] This is an uncomplete list.

[9] Vice-Chair of the IEEE/PELS Harmonic Filters & Power Quality Problems Working Group, 2005-2007.

Invited International Presentations: Panelist and Speaker Note[6]

[1] Event: **IEEE/PES General Meeting**. Panel Session: Modeling, measurement, and risk assessment of nuisance distributed energy resource islanding. Presentation: New requirements for anti-islanding protection of distributed generators. Denver, USA, 2022.

[2] Event: **49th IEEE Photovoltaic Specialists Conference**. Panel Session: Challenges and opportunities on grid and microgrid integration of PV systems. Presentation: a practical method to design volt-var strategies for PV-rich distribution systems. Philadelphia, USA, 2022

[3] Event: **IEEE/PES/IAS PowerAfrica Conference**. Panel Session: Hosting capacity in distribution networks: Grid integration of solar power. Presentation: Methods for comprehensive assessment of DER hosting capacity. Kigali, Rwanda, 2022.

[4] Event: **IEEE 5th International Symposium on Robotics and Manufacturing Automation** (ROMA), Keynote Speaker. Presentation: Grid-edge technologies: Changing the paradigms to promote the 3D concept. Malacca, Malaysia, 2022.

[5] Event: **20th International Conference on Harmonics and Quality of Power (ICHQP)**. Special Session 1: Power quality data analytics: A new world of applications (**Chair**). Presentation: Practical methods for online monitoring of harmonic resonances in DFIG-based wind parks. Naples, Italy, 2022.

[6] Event: **IEEE/PES General Meeting**. Panel Session: Modeling and analysis of nuisance distributed energy resource islanding detection in field operation. Presentation: Islanding protection for synchronous distributed generators: from tradition frequency to wide-area PMU-based solutions. Virtual, 2021.

[7] Event: **CIRED**. Round Table: RT6 Hosting Capacity. Presentation: Comprehensive assessment of PV and EV hosting capacity on low voltage distribution systems. Virtual, 2021.

[8] Event: **Leading the Charge (NSERC Energy Storage Technology Network)**. Presentation/Workshop: Brazilian storage R&D program: A brief panorama and a project sample. Toronto (Virtual), Canada, 2021.

[9] Event: **The 9th China International Conference on Electricity Distribution**. Round Table: RT2 Power disturbance and power quality in new energy power systems. Presentation: Power quality data analytics: A new world of applications beyond power quality concerns. Virtual, 2020.

[10] Event: **IEEE/PES General Meeting**. Panel Session: Advanced data analytics for power asset management. Presentation: Power quality data analytics for asset condition monitoring: A new world of applications beyond power quality concerns. Virtual, 2020.

[11] Event: **IEEE/PES General Meeting**. Panel Session: Signatures of equipment failures –Application of power quality data analytics to equipment condition monitoring (**Chair**). Presentation: Signatures of equipment failures – Application of power quality data analytics to equipment condition monitoring. Virtual, 2020.

[12] Event: **IEEE/PES Webinar**. Session: How to become an effective reviewer for PES Transaction Papers. Presentation: Reviewer perspective. Virtual, 2020.

[6] This is an uncomplete list of invited presentations in international events.

[13] Event: **NSERC Energy Storage Technology Network – NESTNet Technical Conference)**. Presentation: SEAS: Sustainable Energy for the Advancement of the Society. Toronto, Canada, 2019.

[14] Event: **IEEE/PES General Meeting**. Panel Session: Frontier in power system monitoring: synchronized waveform monitoring system. Presentation: Detection and characterization of sub-synchronous resonances with synchronized waveforms. Portland, USA, 2018.

[15] Event: **IEEE/PES Innovative Smart Grid Technologies – ISGT-LA.** Panel Session: Integration of low-carbon into distribution networks: International experiences. Presentation: Integration of new technologies into Brazilian distribution networks: CPFL experience. Montevideo, Uruguay, 2015.

[16] Event: **IEEE/PES General Meeting**. Panel Session: Advanced modelling and control of future low voltage networks. Presentation: Integration of residential-scale photovoltaic panels in Brazil. Washington DC, USA, 2014.

[17] Event: **IEEE/PES General Meeting.** Panel Session: Future generation of smart meters and their applications. Presentation: Potential contributions of future generation of smart meters for fault location. Vancouver, Canada, 2013.

[18] Event: **IEEE/PES Innovative Smart Grid Technologies – ISGT-LA**. Panel Session: Distributed generation and smart grids: the new reality of electric power systems (**Chair**). São Paulo, Brazil, 2014.

[19] Event**: Frontiers of Engineering – Royal Academy of Engineering and FAPESP**. Presentation: Smart grids: Research at the University of Campinas and international collaborations. Sao Paulo, Brazil, 2014.

[20] Event: **IEEE/PES General Meeting**. Panel Session: Emerging directions in power quality - Alternative applications of PQ disturbance data. Presentation: Distribution system load modeling based on detection of natural voltage disturbances. San Diego, USA, 2012.

[21] Event: **IEEE 16th IEEE International Conference on Harmonics and Quality of Power (ICHQP)**. Panel Session: Emerging directions in power quality - Alternative applications of PQ disturbance data. Presentation: A discussion about load modelling by using voltage disturbance. Hong Kong, China, 2012.

[22] Event: **Canada-Brazil Smart Grid Matchmaking Mission** - International Science and Technology Partnerships Canada (ISTPCanada). Presentation: Collaborative Projects on Smart Grids: University of Campinas and University of Alberta. Toronto, Canada, 2011.

[23] Event: **Canada-Brazil Smart Grid Matchmaking Mission** - International Science and Technology Partnerships Canada (ISTPCanada). Presentation: Brazilian electrical system: An overview. Vancouver, Canada, 2011.

Reviewer for International Journals[7]

[1] IEEE Transactions on Power Delivery

[2] IEEE Transactions on Power Systems

[3] IEEE Transactions on Energy Conversion

[4] IEEE Transactions on Smart Grid

[7] This is an uncomplete list.

[5] IEEE Transactions on Sustainable Energy
[6] IEEE Transactions on Industry Applications
[7] IEEE Transactions on Power Electronics
[8] IEEE Transactions on Industrial Electronics
[9] IEEE Transactions on Control Systems Technology
[10] IEEE Power Engineering Society – Letters Section
[11] IEEE Access
[12] IEEE Open Access Journal of Power and Energy
[13] IET Electric Power Applications
[14] IET Generation, Transmission & Distribution
[15] IET Renewable Power Generation
[16] IET Power Electronics
[17] Electric Power Systems Research
[18] International Journal of Electrical Power & Energy Systems
[19] International Journal of Power & Energy Systems
[20] International Journal of Energy Technology and Policy
[21] International Journal of Global Energy Issues
[22] International Journal of Modelling and Simulation
[23] Electric Power Components and Systems
[24] European Transactions on Electrical Power
[25] European Power Electronics and Drives Journal
[26] Neurocomputing

Reviewer for International Conferences[8]

[1] IEEE/PES 20th International Conference on Harmonics and Quality of Power, Naples, Italy, 2022.
[2] IEEE/PES 19th International Conference on Harmonics and Quality of Power, Dubai, United Arab Emirates, 2020.
[3] IEEE/PES 18th International Conference on Harmonics and Quality of Power, Ljubljana, Slovenia, 2018.
[4] IEEE/PES 17th International Conference on Harmonics and Quality of Power, Belo Horizonte, Brazil, 2016.
[5] IEEE/PES General Meeting, Denver, USA, 2022.
[6] IEEE/PES General Meeting, Virtual, 2021.
[7] IEEE/PES General Meeting, Virtual, 2020.
[8] IEEE/PES General Meeting, Atlanta, USA, 2019.
[9] IEEE/PES General Meeting, Portland, USA, 2018.
[10] IEEE/PES General Meeting, Chicago, USA, 2017.

[8] This is an uncomplete list.

[11] IEEE/PES General Meeting, Boston, USA, 2016.
[12] 19th Power Systems Computation Conference (PSCC 2016), Italy, 2016.
[13] IEEE/PES General Meeting, Denver, USA, 2015.
[14] IEEE/PES General Meeting, Washington, USA, 2014.
[15] 18th Power Systems Computation Conference (PSCC 2014), Poland, 2014.
[16] XIX International Conference on Electrical - IEEE ICEM10, Italy, 2010.
[17] IEEE Energy Conversion Congress and Exposition - ECCE 2010, USA, 2010.
[18] 17th Power Systems Computation Conference (PSCC 2011), Sweden, 2011.
[19] International Symposium on Energy Engineering, Economics and Policy - EEEP 2009, USA, 2009.
[20] 13th European Conference on Power Electronics and Applications - EPE 2009, Spain, 2009.
[21] IEEE Energy Conversion Congress and Exposition - ECCE 2009, USA, 2009.
[22] International Symposium on Energy Engineering, Policy and Economics: EEEP 2009, USA, 2009.
[23] 39th IEEE Power Electronics Specialists Conference (PESC 2008), Greece, 2008.
[24] International Electric Machines and Drives Conference - IEMDC, Turkey, 2007.
[25] 8th IEEE Power Electronics Specialist Conference - PESC 2007, USA, 2007.
[26] 13th IEEE Mediterranean Electrotechnical Conference - MELECON 2006, Spain, 2006.
[27] EUROCON 2005, Scotland, 2005.
[28] IASTED International Conference on Power and Energy Systems, Marina Del Rey, EUA, 2005.
[29] VIII Congresso Brasileiro de Eletrônica de Potência - COBEP 2005, Recife, Brasil, 2005.
[30] 3rd International IEEE Conference on Industrial Informatics - INDIN'05, Australia, 2005.
[31] 12th IEEE Mediterranean Electrotechnical Conference - MELECON 2004, Croatia, 2004.

AWARDS[9]

- World's Top 2% Scientists by Stanford University[10]
- Outstanding Reviewer Award – IEEE Transactions on Power Delivery, 2023.
- Top 10 Electronics and Electrical Engineering Scientist in Brazil. Research.com – Top Scientists Ranking, 2022.
- Best Brazilian Ph.D. Dissertation CAPES Award (supervisor), Electrical Engineering, the most prestigious Brazilian Ph.D. award recognizing as the best Ph.D. Dissertation nationally concluded in 2022.
- Best Ph.D. Dissertation Award from FEEC/UNICAMP (supervisor), a yearly award recognizing the best Ph.D. dissertation completed at FEEC/UNICAMP, 2023.
- Outreach (Community Service) Award, the most prestigious award granted by UNICAMP to recognize the contribution for society by transferring knowledge and technology to the industry and other sectors, 2021.

[9] This is an uncomplete list.

[10] Ioannidis, John P.A. (2022), "September 2022 data-update for "Updated science-wide author databases of standardized citation indicators", Elsevier Data Repository, V4, doi: 10.17632/btchxktzyw.4

- IEEE PES T&D Committee Award for Outstanding Technical Report– as the Chair of the Working Group on Power Quality Data Analytics, 2020.
- Educator Excellence Award, the most prestigious award granted by UNICAMP recognizing the quality of educators, 2020.
- Inventor award in licensed software category, award granted by INOVA – Agency of Innovation (UNICAMP), 2019.
- Inventor award in patent category, award granted by INOVA – Agency of Innovation (UNICAMP), 2019.
- Outstanding Reviewer Award – IEEE Transactions on Power Systems, 2018.
- Best Ph.D. Dissertation Award from FEEC/UNICAMP (supervisor), a yearly award recognizing the best Ph.D. dissertation completed at FEEC/UNICAMP, 2018.
- Best Ph.D. Dissertation Award from FEEC/UNICAMP (supervisor), a yearly award recognized the best Ph.D. dissertation completed at FEEC/UNICAMP, 2018.
- Zeferino Vaz Award, 2015, the most prestigious award granted by UNICAMP for performance as an outstanding researcher from 2009 to 2014.
- Best Brazilian Ph.D. Dissertation CAPES Award (supervisor), Electrical Engineering, the most prestigious Brazilian Ph.D. award recognizing as the best Ph.D. Dissertation nationally concluded in 2012.
- Best Ph.D. Dissertation Award from FEEC/UNICAMP (supervisor), a yearly award recognizing the best Ph.D. dissertation completed at FEEC/UNICAMP, 2013.
- Awarded with Research Productivity Grants by CNPq Tier 1 since 2006. This grant is given to the top best Brazilian researchers as an acknowledgement of their performance.
- Author of the Best Paper Award in the VI Brazilian Conference on Power Quality – 2005.
- Supervisor of the best project submitted to the II National Electrical Engineering Student Prize Project Conquest promoted by Schweitzer Engineering Laboratories, Brazil, 2005.
- Supervisor of the second-best project submitted to the II National Electrical Engineering Student Prize Project Conquest promoted by Schweitzer Engineering Laboratories, Brazil, 2004.